# Discrimination and Income Differentials

*By* JAMES GWARTNEY*

Income differentials between whites and nonwhites may result from several factors. The two populations differ in educational attainment, age distribution, geographic distribution, and rural-urban distribution; all of which are related to income and are, in some cases, determinants of it. When measuring employment discrimination, the relevant comparison is between individuals of similar productive capacity who differ only in color.[1]

This study seeks to break down the income differential between whites and nonwhites into two categories: (a) a differential resulting from differences in productivity factors not directly related to employment discrimination, and (b) a residual unaccounted for by differences in productivity factors and which may result largely from employment discrimination. Assuming homogenous preferences and standardizing the white and nonwhite populations for all differences in productivity factors that affect income, we could reasonably infer that any remaining income differential approximates income differences resulting from color discrimination in employment.

It should be noted that differences between whites and nonwhites in productivity factors may be the result of color discrimination in areas other than employment. The magnitude of the income differences resulting from differences in productivity factors will give some indication of the possible intensity of color discrimination in education and in other areas not related to employment discrimination.

If there were employment discrimination against nonwhites, they would be expected to receive lower incomes than whites of similar employability. If an employer had a preference for white labor relative to nonwhite labor purely because of color, he would be indifferent between white and nonwhite employees of similar employability only if the nonwhite employees were paid lower wages. White employees of similar employability would be preferred if the wage rate were identical for both whites and nonwhites. The greater the intensity of employment discrimination against nonwhites, the lower the nonwhite wage rate, and thus earnings, relative to that of whites of similar employability.

Employment discrimination could be present however, even if the money-wage rates were identical. The terms and conditions of the sale of labor by an employee include not only wages and related monetary compensation, but also working conditions and other nonpecuniary benefits. Individuals have some trade-off between preferred working conditions and additional money income. They would be willing to take less money income if the employment had offsetting nonpecuiniary benefits. Since these factors result in a difference between money income and "total"

* The author is assistant professor of economics at Florida State University. He wishes to thank Kenneth McCaffree, John Floyd, J. B. Gillingham, Yoram Barzel, Al Holtmann, William Laird, and the referee for helpful suggestions on an earlier draft of this paper. The author also gratefully acknowledges the support of a grant from the Manpower Administration of the *U.S.* Department of Labor.

[1] The terminology of this paper includes locational factors such as regional and city-size distribution among "productivity factors." While locational factors are not often considered productivity factors, they do affect earnings capacity, and have the potential of contributing to income differentials between individuals and/or groups.

income, the total income of a white could be greater than for a nonwhite, even if their money incomes were identical, assuming the white received greater nonpecuniary job benefits.[2] Since all of the data of this paper are money income or earnings data, we can investigate only the consistency of those data with employment discrimination.[3] But money income is a sizeable component of total income, and where discrimination resulted in a significant total income differential between whites and nonwhites, we would expect to observe a money income differential as well.

In the following discussion, Section I estimates the importance of various factors in explaining the money income differential between white and nonwhite urban males, 25 years of age and over, in 1960.[4] Section II contains similar estimates using both mean and median earnings data for males in nonfarm occupations. Section III considers regional differences in earnings differentials between white and nonwhite males.

After adjustment for differences in education, scholastic achievement, age, region, and city size, the nonwhite median income is estimated between 81 and 87 percent of the white for urban males and 77 and 86 percent for males in nonfarm occupations. When mean income data are used, the estimated adjusted nonwhite/white income ratio is only slightly smaller than in the case of medians.

The adjusted nonwhite/white earnings ratio is estimated to be greater in the North than in the South. In the North for nonfarm occupations, the adjusted nonwhite/white earnings ratio is estimated between .83 and .88, compared to .68 and .74 for the South.

The results indicate that a large portion of the income differential between white and nonwhite urban males is the result of differences in quantity of education and scholastic achievement. Differences between whites and nonwhites in these two education-related factors are estimated to have accounted for nonwhite urban males receiving between 23 and 27 percent less income than white urban males in 1959. The size of these estimates indicate that unless differences between the two populations in these two factors can be reduced substantially, the median income of nonwhite males is unlikely to increase to more than 70 to 80 percent that of whites, even if employment discrimination is substantially reduced.

However, the unexplained differential in income between the two populations was estimated between 14 and 25 percent for nonfarm occupations and 13 to 19 percent for urban areas in the United States. This indicates that one-third to three-fifths of the nonwhite-white income differential remained unaccounted for after adjustment for the productivity factors of this paper and this residual may result largely from employment discrimination.

## I. *Income Differences Between White and Nonwhite Urban Males in 1959*

The median income of nonwhite urban

[2] For example, a Negro might prefer to be a filling station attendant rather than a garbage collector. Strong employment discrimination might result in his becoming a garbage collector. His money income may be as great or greater, but his total income is less because he would have preferred employment as a filling station attendant.

[3] Wage and salary income, were it available, would be more appropriate than income data reflecting income from other assets in addition to earnings from labor. If there is proportionality between the two income measures, the relative incomes will be unaffected. On the assumption that relative income from other assets is a positive function of income level, the income data for whites may overstate their wage and salary income relative to nonwhites. However, if as seems likely, nonwhite income from labor is affected more by discrimination than their non-labor income, the bias will be in the opposite direction.

[4] M. Zeman estimated the significance of various factors in explaining income differences between whites and nonwhites in 1939. Due to data limitations, Zeman did not standarize for a number of factors considered in this paper.

males was 58.3 percent of white urban males in 1959. The income differential between white and nonwhite urban males is partially due to distributional differences in productivity factors.

This section seeks to estimate the income ratio of nonwhite to white urban males after correction for income differences resulting from differences in productivity factors. These factors include quantity of education, level of scholastic achievement, regional, age, and city-size distributions.

Three criteria were used in choosing productivity factors relevant to the explanation of income differentials between whites and nonwhites. First, only factors generally recognized as determinants of money income, or as closely correlated with income, were used in this study. Second, the factors chosen are *not* directly related to employment discrimination as such. For example, the median income of nonwhites in the United States is less than that of whites partially because of the overrepresentation of nonwhites in the low-income South—a situation which is not the result of employment discrimination.[5] By contrast, occupational distribution according to color is related to employment discrimination. Therefore, no adjustment was made for differences in occupational structure. Third, factors were either considered simultaneously, or chosen where the apparent relationship with other factors was one of independence. Thus even though low earnings are associated with youth, the factor of age is utilized in explaining the income differential only if the relatively low incomes are not the result of such other factors as size of cities or the regional distribution of population, with which both low earnings and age might also be correlated.

Standardization could either increase or decrease the magnitude of the observed income difference between whites and nonwhites. Factors with positive (negative) signs are those which tend to make the differential larger (smaller) than it would have been in the absence of those factors.

The income differential between whites and nonwhites is disaggregated by constructing indexes of *income* and *distributional* differences. *Distributional* differences in income result from differences in productivity factors between whites and nonwhites. *Income* differences result from differences in income between whites and nonwhites after adjustment for the productivity factors considered.

The Laspeyres index of *income differences* is the hypothetical ratio of the median income of nonwhite to white males, assuming both color groups were distributed among productivity categories as whites actually were. The Paasche index of income differences is a similar hypothetical ratio under the assumption that both color groups had the productivity distribution of nonwhites.[6] The index of income differences is essentially an estimate of the ratio of nonwhite to white income after adjustment for differences in the productivity factors considered.

The indexes of *distribution differences* represent the hypothetical ratios of nonwhite

[5] The intensity of discrimination in the South has, if anything, resulted in migration from the South which tends to decrease the magnitude of the regional distribution factor.

[6] The mathematical form of the index of income differences is:

$$\frac{\sum (Y_n \cdot D_w)}{\sum (Y_w \cdot D_w)} \text{ (Laspeyres) and, } \frac{\sum (Y_n \cdot D_n)}{\sum (Y_w \cdot D_n)} \text{ (Paasche)}$$

where,

$Y$ is the median income of those with income within a productivity category (e.g. age, education or region) according to color,

$D$ is the percent of population according to color with income within the productivity category, and

$n$ and $w$ are subscripts denoting nonwhite and white population groupings.

to white income if whites and nonwhites had the same income *within* productivity categories.[7] The index of *distribution differences* is essentially an estimate of income differences that result from differences in the distribution of productivity factors. The index of *income differences* multiplied by the index of distribution differences yields an index of "total" money income differences, which closely approximates the actual ratio of nonwhite to white income.[8]

The index of *income differences* will be less than unity if the median income of nonwhites is less than whites *within* productivity categories. The index of *income differences* is an estimate of the income ratio of nonwhites to whites if the two populations were similarly distributed among the adjusted productivity categories.

The index of *distribution differences* will be less than unity if nonwhites are overrepresented relative to whites in low income productivity categories. Such an index is an estimate of income differences resulting from differences in productivity capacity between the two populations. We proceed to adjust the data for the effects of differences in productivity factors that influence the ratio of nonwhite to white income.

1. *Quantity of Education Adjustment.*

White urban males have a greater quantity of education than nonwhites. Since income is positively related to education, whites would be expected to receive larger incomes than nonwhites on this basis. In isolating the "quantity of education" effect, the 1960 Census data indicating the median income of white and nonwhite urban males for each of eight different educational levels were utilized, (Table 223 of the *Final Report*, "Characteristics of the Population.") Both indexes of income and distribution differences were calculated. The Laspeyres and Paasche indexes of income differences were 67.0 and 69.9 percent, respectively, after correction for differences in the quantity of education distributions between white and nonwhite urban males.[9] The adjustment indicates that the income of nonwhite urban males was just over two-thirds the income of white urban males with similar quantity of education in 1960.

2. *Scholastic Achievement Adjustment.*

Whites and nonwhites differ not only in quantity of education, but also in what we shall term scholastic achievement level. National education tests show that nonwhites with the same number of years of formal schooling perform at a significantly lower level than whites. Some of the income differential between whites and nonwhites is the result of this lower achievement level.

The outlay of funds per pupil is often less for nonwhites than for whites, hence the lower achievement of nonwhite students may be the result of attending schools of inferior quality. Days of attendance vary among those with equal number of years of education. Nonwhites with equal quantity of education have fewer days of attendance than whites because of their overrepresentation in schools (largely in the South) with a six to eight month term

[7] The form of the index of distribution differences is:

$$\frac{\sum (Y_n \cdot D_n)}{\sum (Y_n \cdot D_w)} \text{ (Laspeyres) and, } \frac{\sum (Y_w \cdot D_n)}{\sum (Y_w \cdot D_w)} \text{ (Paasche)}$$

Since the distributional categories are in percent form, the estimates for those with income are not affected by differences in the size or participation rates of the two labor forces. One could construct an index of distribution differences assuming both color groupings had the median income of the total population within productivity categories. Since whites compose a large percentage of the total population, such an index would closely approximate the Paasche index.

[8] Also the inverse of the index of distribution differences multiplied by the ratio of total money income differences yields the index of income differences.

[9] The data and specific calculations for all estimates of this paper are contained in an Appendix that is available from the author on request.

and a seven year elementary degree requirement. In addition, even if nonwhites have a similar attendance record in schools of comparable quality, they may do less well than whites because cultural and environmental factors may hinder their taking advantage of educational programs reflecting white cultural standards, values, and traditions. Thus even when whites and nonwhites attend the same schools, it is possible, even probable, that a differential in achievement will result.

A recent study for the *U.S.* Office of Education by James Coleman, et al., estimates differences in scholastic achievement between whites and nonwhites in terms of quantity of education (years of schooling) for three different grade levels in metropolitan areas.[10] The estimates of scholastic achievement of the *Coleman Report* were derived from data based on 645,000 public school students' scores on the Educational Testing Service School and College Ability Test.[11] This test measures:

> . . . the skills which are among the most important in our society for getting a good job and moving up to a better one, and for full participation in an increasingly technical world. Consequently, a pupil's test results at the end of public school provide a good measure of the range of opportunities open to him as he finishes school—a wide range of choice of jobs or colleges if these skills are very high; a very narrow range that includes only the most menial jobs if these skills are very low. [p. 20]

The *Coleman Report* indicates that in metropolitan areas the scholastic achievement gap increases as the formal quantity of education increases. Within regions, nonwhites are behind whites by 1.4 to1.6 years at grade 6, by 2.2 to 2.5 years at grade 9, and by 2.9 to 3.6 years at grade 12. For whatever reason, these data indicate that a nonwhite with a sixth grade education is only as well qualified for employment as a white with 4.4 to 4.6 years of education and the employability differential increases at higher grade levels.[12]

Using the maximum scholastic achievement differential of the *Coleman Report* for grades 6, 9, 12, a maximum estimate of the scholastic achievement differential was projected under the assumptions that (a) the differential is linear, and (b) whites and nonwhites are of the same scholastic achievement level before entrance to school.[13] Under the same assumptions, plus the further assumption that the scholastic achievement differential for grade levels beyond twelve remained constant at the level of grade 12, a minimum estimate of the scholastic achievement differential was projected, using the minimum estimates of the scholastic achievement differential of the *Coleman Report.*

The income ratio of nonwhites to whites after adjustment for both quantity of education and scholastic achievement was estimated by comparing the actual income of nonwhite urban males in an education

[10] This study will subsequently be referred to as the *Coleman Report.*

[11] For additional comments on the *Coleman Report,* see Robert Dentler, Samuel Bowles and Henry Levin, Daniel Moynihan, and Robert Nichols. Much of the criticism of the *Coleman Report* concerns the causes of the estimated scholastic achievement differential, rather than its magnitude.

[12] Because the *Coleman Report* did not disaggregate data for nonwhites as a group, these differentials are for Negroes. However, except for Oriental Americans, the differential between whites and other nonwhite groups was similar to the Negro differential. In addition, since 95 percent of all nonwhites are Negroes, one would expect the differential between whites and Negroes to be almost identical to the differential between whites and nonwhites.

[13] Recent studies indicate that nonwhites are, in fact, already behind whites upon entrance to school. The results of the *Coleman Report* (p. 20) indicated scores of minority pupils are as much as one standard deviation below the majority pupils' scores in the first grade. No adjustment was attempted for this differential because comparative income data for whites with no education and low achievement would not be available. Failure to make adjustment for this factor will tend to understate the ratio of nonwhite to white income after correction for the scholastic achievement factor.

cell with the income of white urban males equal in achievement level with the nonwhites of the education cell.[14] The results indicate that in 1960 the income of white urban males was between 12.2 (Paasche) and 18.1 (Laspeyres) percent greater than nonwhite urban males because of the lower achievement level of nonwhites.[15] Cumulatively, the adjusted nonwhite/white income ratio was estimated between 82.1 and 85.1 (Table 1).[16]

[14] The form of the adjusted index of income differences between whites and nonwhites is:

$$\frac{\Sigma(Y_n \cdot E_w)}{\Sigma(Y'_w \cdot E_w)} \text{ (Laspeyres) and, } \frac{\Sigma(Y_n \cdot E_n)}{\Sigma(Y''_w \cdot E_n)} \text{ (Paasche)}$$

where, $Y_n$ is the median income of nonwhite urban males with income in 1959 for each of the eight different quantity of education cells,
$Y'_w$ and $Y''_w$ are respectively, maximum and minimum estimates of the incomes of white urban males of equal achievement level with the nonwhites of the education cell, and
$E_w$ and $E_n$ represent the percent of white and nonwhite urban males within each education cell with income in 1959.

It is possible, using both the maximum and minimum estimates of income adjusted for scholastic achievement differences within an education cell, to make two estimates of the Laspeyres and Paasche indexes of income differences.

[15] The data used are from 1960 Census of Population, "Characteristics of the Population" Table 223. The income data for white males of equal achievement level with nonwhites of a given education cell were derived by interpolation, using the achievement level differentials of the *Coleman Report* and the assumptions stated in the text of this paper. The data of the *Coleman Report* were not disaggregated according to sex, thus the achievement level differences were assumed to be the same for males as for the total.

[16] The data of the *Coleman Report* were obtained in September 1965. Since those covered by the 1959 income data completed their education anywhere from several years to a half century or more before 1965, the differential in level of scholastic achievement is assumed constant over time. Increased expenditures on nonwhite education relative to white and Supreme Court decisions on desegregation suggest a possible narrowing of achievement differentials in recent years inasmuch as they are related to differences in the quality of schools. If there has been a narrowing of the achievement level differentials over time, the estimate of the adjusted nonwhite/white income ratio is biased downward. However, the little evidence existing on comparative test scores over time does not confirm a narrowing of achievement level differentials, but indicates there has been little change (see John Miner and A. M. Shuey). In any case, there would not seem to be any a priori reason to suggest a smaller scholastic achievement differential for the adult population in 1959 than was the case for the school age population of 1965.

### 3. *State Distribution.*

Nonwhites are overrepresented in southern states. This reduces their income relative to whites because (a) incomes of both whites and nonwhites are lower in southern states than northern states and (b) the income differential is greater in southern states.

The median income and education distributions according to color are available for urban areas by state from the 1960 Census, *Detailed Characteristics* (Tables 47 and 138). This provides the information to calculate the indexes of income and distribution differences, simultaneously adjusting for state distribution and quantity of education difference.[17] The marginal effect of the state distribution factor can be estimated by comparing the indexes of income differences after adjustment for the state distribution and quantity of education factors with the indexes when adjustment was made for quantity of education only. Thus, double counting of regional income differences that are really the result of educational differences between regions can be avoided.

After adjustment for both quantity of education and state distribution, nonwhite urban males are estimated to receive incomes between 72.3 (Paasche) and 72.9 (Laspeyres) percent as large as incomes of white urban males. Comparing these indexes with the indexes when only quantity

[17] This was done for all states with a nonwhite population of 10,000 or more. These states include more than 98 percent of the nonwhite population in the United States. Due to data limitations, the index of income differences for northern states was estimated from the index of distribution differences assuming both whites and nonwhites received the income of the total population. The Laspeyres (Paasche) index of income differences for the North was derived by weighting the state indexes according to the percentage of all whites (nonwhites) that resided in that state.

TABLE 1—INCOME OF NONWHITES AS A PERCENTAGE OF WHITES, ADJUSTED FOR VARIOUS DETERMINANTS OF INCOME DIFFERENTIALS BETWEEN WHITE AND NONWHITE URBAN MALES FOR THE UNITED STATES IN 1959

| | *Index of Income Differences*[a] | | *Marginal Effect of Factor* | |
|---|---|---|---|---|
| | Laspeyres | Paasche | Laspeyres | Paasche |
| Unadjusted Income Ratio (Nonwhite/White) | 58.3 | 58.3 | — | — |
| *Explanatory Factors* | | | | |
| A. Quantity of Education | 67.0 | 69.9 | 8.7 | 11.6 |
| B. Scholastic Achievement | 85.1 | 82.1 | 18.1 | 12.2 |
| C. State Distribution | 91.0 | 84.5 | 5.9 | 2.4 |
| D. City Size | 89.3 | 83.3 | − 1.7 | − 1.2 |
| E. Age Distribution | 86.5 | 80.9 | − 2.8 | − 2.4 |

[a] Since both a maximum and minimum scholastic achievement differential was used from the *Coleman Report*, it is possible to calculate two Paasche and Laspeyres indexes of income differences when adjusting for this factor. The above estimates of the scholastic achievement factor "bracket" the other two estimates that could be calculated. Therefore, the procedure yields both a maximum and minimum estimate of the nonwhite/white income ratio adjusted for the five productivity factors. The same procedure was also followed for the estimates of Tables 2 and 3.

*Source:* Estimates are derived from *U.S.* Census data, "Characteristics of the Population," Tables 219 and 223; *Subject Report, Size of Place*, Tables 2, 3, 4, and 5; *Detailed Characteristics*, Tables 47 and 138.

of education was adjusted for, the data indicate the income of nonwhite urban males increased between 2.4 (Paasche) and 5.9 (Laspeyres) percent relative to that of white urban males as the result of the marginal effect of the state distribution adjustment. The Laspeyres adjustment, which assumes that both populations had the distributional characteristics of whites, is greater than the Paasche estimate because of a smaller income differential in the North—the area where whites are relatively overrepresented. Cumulating the adjustments for (a) quantity of education, (b) scholastic achievement, and (c) state distribution, the income of nonwhite urban males is estimated between 84.5 and 91.0 percent of white urban males (Table 1).

4. *City-Size Distribution.*

Nonwhites are overrepresented relative to whites in the larger cities. Median income differs among cities of different size, tending to increase as the size of the city increases. Nonwhite overrepresentation in the larger cities would therefore result in the income of nonwhites being greater than if they were distributed among cities in the same manner as whites.

Data from the 1960 Census gives the median income of the total population and of nonwhites according to size of city by region, as well as the percentage of the white and nonwhite population residing in cities of each size, (see Tables 2, 3, 4, and 5, *Subject Report, Size of Place*). Thus, both a Laspeyres and Paasche index of distribution differences can be constructed to estimate the amount by which nonwhite income exceeds white income because of the overrepresentation of nonwhites in large cities. The indexes are calculated by region, thus minimizing interaction with the state distribution factor.

The results of the adjustment indicate that the incomes of nonwhite urban males were between 1.2 (Paasche) and 1.7 (Laspeyres) percent higher relative to white males because of this factor. Adjust-

ing for the city-size factor increases the white/nonwhite income differential—hence the index of distribution differences is greater than one and the sign of the factor is negative. The Laspeyres index, which assumes both populations were distributed among cities in the same manner as whites, is greater than the Paasche index because the city-size differential is greater in the North. After the adjustment for city size in addition to the three previous factors, the nonwhite/white income ratio for urban males is estimated between 83.3 and 89.3 percent.

5. *Age Distribution.*

Nonwhite urban males were overrepresented in the prime earning age categories in the United States in 1959. While whites are overrepresented in older age categories, particularly those over 65, nonwhites are overrepresented among the young. However, the larger percentage of the white urban male population among those past the years of prime earnings more than offsets the youth of the nonwhite population.[18]

Data are available to calculate both the Laspeyres and Paasche indexes of distribution differences ("Characteristics of the Population," Table 219). The results indicate that if the age distribution of white urban males in 1959 had been the same as that of nonwhite urban males, the income of nonwhites relative to whites would have been between 2.4 (Paasche) and 2.8 (Laspeyres) percentage points lower than the observed ratio (i.e. negative in explaining the income differential).

*Summary of Estimates for Urban Males.*

Table 1 consolidates the separate estimates of the magnitude of various factors upon the earnings differentials between white and nonwhite urban males. While the unadjusted income of nonwhites was only 58.3 percent as great as whites, the income of nonwhite urban males is estimated between 81 and 87 percent of the white income after adjustment for the five factors of Table 1. An income differential of between 13 and 19 percent remains unexplained.

## II. *Earnings Differentials Between Whites and Nonwhites in Nonfarm Occupations in 1959*

The estimates of Section I might be in error because it was not always possible to adjust for all factors simultaneously.[19] In addition, only median income data were used, and mean income estimates would be useful for purposes of comparison.

Mean and median earnings data for males according to color, age, education, and region were obtained for nonfarm occupations from 1960 Census data, *Subject Report, Occupation by Earnings and Education.* This data will allow for the simultaneous adjustment for all factors of Section I, except city-size.

The data used in this section differ from that of Section I in four respects. First, the data used are for earnings rather than income. Earnings data, unlike the income data used in Section I, include only wage and salary and self-employment income.[20] Second, they are for males with income between 25 and 64 years of age in nonfarm occupations, rather than males 25 and over in urban areas. Third, the quantity of education data used in Section I was more refined, having eight education categories

[18] Since the data cover those over age 25 with income, the youth of the nonwhite population is less important than if the data were for all with income. Census data used contained six age classes: 25–34, 35–44, 45–54, 55–64, 65–74, and 75 years of age and over.

[19] Obvious interaction between such factors as region and quantity of education was avoided by estimating their effect simultaneously.

[20] Income data includes, in addition to earnings, income from Social Security, pensions, Veterans payments, rents, interest or dividends, unemployment insurance and welfare payments.

TABLE 2—EARNINGS OF NONWHITES AS A PERCENTAGE OF WHITES, ADJUSTED FOR VARIOUS DETERMINANTS OF EARNINGS DIFFERENTIALS FOR NONFARM OCCUPATIONS FOR THE UNITED STATES IN 1959.

| | *Index of Income Differences* | | *Index of Distribution Differences* | |
|---|---|---|---|---|
| | Median | Mean | Median | Mean |
| Unadjusted Income Ratio (Nonwhite/White) | 60.1 | 54.6 | — | — |
| *Explanatory Factors* | | | | |
| A. Region | | | | |
| Laspeyres | 68.1 | 59.9 | 88.3 | 91.2 |
| Paasche | 63.7 | 55.6 | 94.3 | 96.8 |
| B. Region-Age | | | | |
| Laspeyres | 66.5 | 58.9 | 91.8 | 92.7 |
| Paasche | 62.1 | 55.6 | 98.2 | 98.2 |
| C. Region-Education | | | | |
| Laspeyres | 72.0 | 64.4 | 84.4 | 84.8 |
| Paasche | 71.0 | 64.8 | 85.7 | 84.3 |
| D. Region-Age-Education | | | | |
| Laspeyres | 71.2 | 65.4 | 84.3 | 83.5 |
| Paasche | 70.8 | 67.1 | 84.8 | 81.3 |
| E. Region-Age-Education-Scholastic Achievement | | | | |
| Laspeyres | 85.6 | 83.6 | 70.2 | 65.3 |
| Paasche | 77.2 | 75.2 | 77.8 | 72.6 |

*Source:* The data used in calculating the estimates of this table were derived from *U.S.* Census data, ***Subject Report, Occupation by Earnings and Education,*** Tables 1, 2 and 3.

rather than only six.[21] Fourth, estimates of the previous section were based on adjustment for state distribution of the populations, while data of this section will allow for only a North–South regional adjustment.

The adjustment techniques used in this section are identical to those of Section I: the Laspeyres (Paasche) index calculated assuming both whites and nonwhites are distributed among productivity categories in the same manner as whites (nonwhites). Table 2 summarizes the results.

[21] The data used in this section classifies those with 0 to 7 years of education as one group, rather than the 0, 1–4, 5–7 year classes previously used. This is important since a large percentage of the non-white population is in this class. The impact of using the broader educational class will result in an under-estimation of (a) the quantity of education adjustment and (b) the adjusted nonwhite/white income ratio.

After simultaneous adjustment for the four factors considered in Table 2, the median earnings of nonwhite males in nonfarm occupations is estimated between 77 and 86 percent of the earnings of whites. For means, the adjusted earnings ratio is estimated between 75 and 85 percent, 2 percent less than for the medians.

The estimates are consistent with those of Section I. Adjustment for age had little effect after the region-education adjustment was considered. The failure of age to have the negative impact estimated in Section I results from the exclusion of those over 65 from the data used in this section. Since whites are highly overrepresented in the over-65 group, their inclusion increased the observed nonwhite/white income ratio and resulted in the negative contribution of age found in Section I. Table 2 estimates

that adjustment for region-education differences would increase the income of nonwhites by between 10 and 12 percent relative to whites. This is between 2 and 4 percent less than the estimates of Section I. Since this adjustment was made by exactly the same techniques in both cases, the difference between the two estimates must be attributable to the use of broader educational and regional classes in this section.

The median earnings estimate of the scholastic achievement factor of Table 2 is slightly less than the estimate of Section I. When mean earnings data are used, the estimated importance of the scholastic achievement factor increases. The magnitude of the scholastic achievement factor is greater for means than medians because the rate of change in the education-income relationship is greater for means than medians. Thus even though the unadjusted differential was 5 percent greater for means than medians, after adjustment for the four factors of Table 2 the difference was reduced to only 2 percent.

The estimates of this section are not adjusted for city-size, but this deficiency, resulting in an over estimate of the nonwhite /white ratio, is almost surely offset by the inability to use the more refined educational and regional categories of Section I.[22] The data indicate that after adjustment for the four factors of Table 2, an income differential between 14 and 23 percent remained unexplained when median earnings data were used. In the case of mean earnings data the unexplained differential is estimated between 16 and 25 percent—slightly greater than for medians. Thus, adjustment for the factors of this section "explained" 40 to 65 percent of the total income differential between whites and nonwhites in 1959. The probable effect of using mean rather than median income data in the analysis underlying Table 1 can be inferred from the index of income differences between means and medians of this section.

The estimates of the adjusted ratio of nonwhite/white income of Section I are consistent with the estimates of this section. Due to the factors referred to in footnote 22 we might have expected these estimates to be slightly less. Considering the expected downward bias, the results of this section reenforce our estimates of Section I.

## III. *Regional Differences in the Nonwhite/White Earnings Ratio for Nonfarm Occupations*

Previously we indicated the importance of the regional (state) distribution factor on the nonwhite/white relative income for the United States. Now, we investigate *regional* differences in these income differentials. The South is generally believed to be more inclined toward employment discrimination than the North. Census data indicate the median income of nonwhite males in 1959 was 47 percent that of white males in the South and 73 percent in the North. The relative income of nonwhites to whites in the South was only 65 percent of the same ratio in the North.

At least three factors unrelated to employment discrimination, although not necessarily unrelated to other forms of color discrimination, result in making the income data of the South appear very unfavorable relative to the North. First, the quantity of education of nonwhites relative to whites is much less favorable in the South. Second, the nonwhite population in the North is significantly overrepresented in urban areas. Third, the nonwhite

[22] Comparison of the estimates of the region-education adjustment of this section with the state distribution-education adjustment of Section I indicate the more refined classifications of Section I increase the contribution of these two factors by 2 to 4 percent. The city-size factor of Section I was 1.2 to 1.7 and negative in sign. Use of the broader educational classes and failure to adjust for the city-size factor will result in the estimates of this section being 1 to 3 percent less than the estimates of Section I.

TABLE 3—EARNINGS OF NONWHITES AS A PERCENTAGE OF WHITES ADJUSTED FOR VARIOUS DETERMINANTS OF EARNINGS DIFFERENTIALS BY REGION FOR NONFARM OCCUPATIONS IN 1959

| | *Index of Median Income Difference* | | *Index of Mean Income Difference* | |
|---|---|---|---|---|
| | North | South | North | South |
| Unadjusted Income Ration (Nonwhite/White) | 72.7 | 52.1 | 63.7 | 47.1 |
| *Explanatory Factors* | | | | |
| A. Age | | | | |
| Laspeyres | 72.8 | 52.2 | 63.4 | 47.2 |
| Paasche | 72.4 | 52.2 | 63.8 | 47.2 |
| B. Education | | | | |
| Laspeyres | 65.1 | 58.9 | 68.0 | 53.9 |
| Paasche | 67.1 | 61.9 | 70.8 | 58.2 |
| C. Age-Education | | | | |
| Laspeyres | 75.8 | 58.6 | 68.4 | 54.6 |
| Paasche | 79.5 | 62.1 | 72.2 | 59.7 |
| D. Age-Education-Scholastic Achievement | | | | |
| Laspeyres | 87.9 | 73.9 | 86.0 | 72.5 |
| Paasche | 83.6 | 67.9 | 81.3 | 66.5 |

*Source:* See Table 2.

population in the North is not only overrepresented in urban areas, but specifically in large urban areas with high money income.

Table 3 disaggregates the estimates of Section II by region. After simultaneous adjustment for the four factors of Table 3, the median earnings ratio of nonwhites to whites is estimated between .83 and .88 in the North and .68 and .74 in the South. Similar differences in the adjusted mean earnings ratio exist between the two regions. The adjusted relative earnings estimates of the nonwhite/white income ratio for nonfarm occupations (Table 3) for the South are 82 and 83 percent of similar estimates for the North.[23] Standardization for differences in the productivity factors between the two populations reduces, but does not eliminate, the North–South differential for relative income of nonwhites to whites.

Estimates similar to those of Table 3, using the same data can be derived by regression analysis. When the logarithm of income is the dependent variable and a dummy variable (white 1 and nonwhite 0) is used for color, the regression coefficient of color is the antilogarithm of the white/nonwhite income ratio.[24] Table 4 presents

[23] The North-South differential is slightly overstated because of the greater city-size contribution in the North. The city-size factor in the North is estimated between 1.5 and 1.8—in the South 0.9 and 1.6. In both cases it is negative, indicating the actual nonwhite/white income ratio is overstated because of the failure to adjust for this factor. In addition, it is usually argued that less money per head is spent on the education of southern Negroes as compared to northern Negroes, resulting in an inferior quality of education for the former. However, the *Coleman Report* indicated the white/nonwhite scholastic achievement differential for a given grade level was nearly as great in the North as the South. The existence of a greater scholastic achievement differential in the South would decrease the adjusted North-South differential.

[24] The regression coefficient for color is $log\ Y^w - log\ Y^n$, or $log\ (Y^w/Y^n)$. The nonwhite/white earnings ratio $(Y^n/Y^w)$ contained in Table 4 is the inverse of the antilogarithm of the color coefficients.

TABLE 4—REGRESSION EQUATIONS ESTIMATING THE NONWHITE/WHITE EARNINGS ($Y^n/Y^w$) RATIO AFTER ADJUSTMENT FOR VARIOUS PRODUCTIVITY FACTORS ($t$-ratios in parentheses)[b]

| Logarithm of Median Earnings[a] | $b_0$[c] | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $X_5$ | $X_6$ | $R^2$ ($df$) | $Y^n/Y^w$ |
|---|---|---|---|---|---|---|---|---|---|
| 1. North | 3.461 | .060 (4.78) | .057 (4.52) | .034 (2.71) | .022 (14.99) | −.042 (4.10) | .0326 (1.32) | .791 (41) | .928 |
| 2. North | 3.430 | .060 (4.22) | .057 (4.04) | .034 (2.42) | .021 (11.99) | −.017 (2.30) | .0760 (3.10) | .776 (41) | .839 |
| 3. South | 3.232 | .069 (4.56) | .063 (4.23) | .020 (1.34) | .031 (17.51) | −.056 (4.58) | .1072 (3.60) | .817 (41) | .781 |
| 4. South | 3.190 | .069 (3.99) | .063 (3.70) | .020 (1.18) | .029 (13.78) | −.023 (2.56) | .1645 (5.43) | .806 (41) | .684 |

$X_1$ = dummy—35–44 age group
$X_2$ = dummy—45–54 age group
$X_3$ = dummy—55–64 age group
$X_4$ = years of education of those with income in the age education cell
$X_5$ = scholastic achievement differential between whites and nonwhites
$X_6$ = dummy for color (white 1 and nonwhite 0)

[a] Odd (even) numbered equations are for data containing the maximum (minimum) estimate of the scholastic achievement differential from the *Coleman Report*.

[b] Critical values for $t$ are approximately ±2.42 for 99 percent, ±1.68 for 95 percent, ±1.30 for 90 percent, ±1.05 for 85 percent.

[c] The coefficient $b_0$ is an estimate of the median earnings of nonwhite males in the 25–34 age group. The interpretation of the last column ($Y^n/Y^w$) is given in fn 24.

such regression equations by region, using median earnings as the dependent variable. In addition to the color variable, adjustment was made for differences in education ($X_4$), age ($X_1$, $X_2$, $X_3$), and scholastic achievement ($X_5$). The regression was run using both the maximum and minimum estimates of the scholastic achievement differential between whites and nonwhites.

Nonwhite earnings are estimated between 83.9 and 92.8 percent of the white earnings in the North, and 68.4 and 78.1 percent in the South. The color variable is significant at the 0.90 level in all cases. The results also indicate that even after correction for age, education, and scholastic achievement differences, the adjusted nonwhite/white earnings ratio is greater in the North than the South.

The estimates of the nonwhite/white earnings ratio presented in Table 4 are just slightly greater than those of Table 3. The small difference resulted because, after adjustment for the scholastic achievement factor, the nonwhite/white income ratio increases as quantity of education increases, i.e. the differential is less for higher education cells. When using regression analysis, all observations receive equal "weight." However, when using the method of Table 3, observations in the highest education cells receive less weight because of the smaller number of individuals in those cells. Thus, there was a small difference between the estimates.

The estimates of Table 4 reenforce our previous estimates that after adjustment for the productivity factors of this paper, an unexplained income differential between white and nonwhite males still remains and the unexplained differential is larger in the South than the North.

## REFERENCES

G. Becker, *The Economics of Discrimination*. Chicago 1957.

**S. Bowles and H. M. Levin,** "The Determinants of Scholastic Achievement—An Appraisal of Some Recent Evidence," *J. Hum. Resources,* spring 1968, *3,* 1–24.

**J. S. Coleman,** et al., *Equality of Educational Opportunity*. Washington 1966.

**R. A. Dentler,** "Equality of Education Opportunity: A Special Review," *Urban Rev.,* Dec. 1966, *1,* 27–29.

**J. B. Miner,** *Intelligence in the United States*. New York 1957.

**D. P. Moynihan,** "The Crisis of Confidence," presented to the Subcommittee on Executive Reorganization of the U.S. Senate Committee of Government Operations, Dec. 13, 1966.

**R. C. Nichols,** "Schools and the Disadvantaged," *Science,* Dec. 9, 1966, *154,* 1312–14.

**A. M. Shuey,** *The Testing of Negro Intelligence*. New York 1966.

**M. Zeman,** "A Quantitative Analysis of White-Nonwhite Income Differential in the United States in 1939," unpublished doctoral dissertation, Univ. Chicago 1955.

**U.S. Census of Population: 1960,** *U.S. Summary, Final Report,* "Characteristics of the Population."

———, *Subject Report, Size of Place,* PC (3)–1B.

———, *Subject Report, Occupation by Earnings and Education,* PC (2)–7B.

———, *Detailed Characteristics, Final Report,* PC(1) Series.